



Ultra-Slim PLC (FP Sigma)



Real-world motion and temperature control.

Arc and linear interpolation is very handy for pick & place (linear) or glue (arc) applying applications. With the combination of FP Sigma and A4 series servo drive, you can do real 2 axis motion control. With the new accurate thermocouple input unit and our accurate unique PID and IPD algorithm, you can control temperature easier, and more accurately than ever.

Version 2 of the CPU also has an additional expansion port on the left side of the unit. It will allow you to connect up to 4 units of 64 I/O expansion units (32 DC in , 32 Tr out: All outputs are short circuit protected).

Key Features

- Fast Downloads - 9 seconds to download 2K steps
- Fast 41 KHz PWM Output
- 50 Micro Second Throughput
- Floating Point Math
- 3 Serial Ports
- Calendar Time Clock
- Modbus RTU Master/Slave *
- Expansion Cassettes - Using FP-X Cassettes and FP0 Expansion Units
- 120 KHz of 2 Axis Motion Control
- [PID with Auto Tuning](#)
- 4 High-Speed Counters
- 16 Station Network

- Run Time Editing
- PLC to PLC Networking - Up to 16 FP Sigmas can be networked together

* Available on ver. 3 and up

FP Sigma (FPG) Models

You may sort models by clicking the arrows in the appropriate column. If you are searching for a particular model but can't find it, give our [model search](#) utility a try. All downloads have moved to our separate [downloads center](#).

Click one of the links below to view all related models. Models will appear below the links.

- [Control Units](#)
- [Digital Expansions](#)
- [Communication Cassettes](#)
- [Communication Expansions](#)
- [Memory Units](#)
- [Motion Expansions](#)
- [Analog Expansions](#)
- [Accessories](#)
- [Manuals And Software](#)

Currently viewing: FP Sigma (FPG) Control Units

Model Name	Power	Pulse Outputs	Extra Com Ports	Dc Inputs	Npn Outputs	Pnp Outputs	Relay Outputs	Program Size (K)
Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼
FPG-C24R2	24VDC	No	Option	16			8	12
FPG-C24R2H-A	24VDC	No	Option	16			8	32
FPG-C24R2HTM	24VDC	No	Option	16			8	32
FPG-C24R2TM	24VDC	No	Option	16			8	12
FPG-C28P2	24VDC	Yes, up to 2 Axis	Option	16		12		12
FPG-C28P2H-A	24VDC	Yes, up to 2 Axis	Option	16		12		32
FPG-C28P2HTM	24VDC	Yes, up to 2 Axis	Option	16		12		32
FPG-C32T2	24VDC	Yes, up to 2 Axis	Option	16	16			12

FPG-C32T2H-A	24VDC	Yes, up to 2 Axis	Option	16	16		32
FPG-C32T2HTM	24VDC	Yes, up to 2 Axis	Option	16	16		32
FPG-C32T2TM	24VDC	Yes, up to 2 Axis	Option	16	16		12

FPΣ (Sigma)

Specification tables

PERFORMANCE SPECIFICATIONS

Item	Description		
Type of control unit	NPN transistor output type	PNP transistor output type	Relay output type
Part number	FPG-C32T2H/FPG-C32T2HTM	FPG-C28P2H/FPG-C28P2HTM	FPG-C24R2H/FPG-C24R2HTM
Number of I/O points			
No expansion	32 (Input: 16 / Output: 16)	28 (Input: 16 / Output:12)	24 (Input: 16 / Output: 8)
with expansion	Max. 384	Max. 380	Max. 376
Program memory	Built-in Flash ROM		
Program capacity	32,000 steps		
Operation speed	0.32 μs- /step, Basic instructions		
Memory for execution			
External input (X)	1184 points		
External output (Y)	1184 points		
Internal relay (R)	4096 points (R0 to R255F)		
Timer/Counter (T/C)	1024 points ^{1, 2} / At reset: timer 1008 points (T0-T1007), counter 16 points (C1008-C1023), Timer range is selected by instructions from 1ms, 10ms, 100ms, 1s / Counter: 1 to 32767 counts		
Link relay (L)	2048 points ¹		
Data register (DT)	32765 words (DT0-DT32764) ¹		
Link data register (LD)	256 words ¹		
Index register (I)	14 words (I0-ID)		
Differential points	Unlimited number of points		
Master control relay points	256 points		
Labels (JP+LOOP)	256 labels		
Number of step ladder	1000 stages		
Number of subroutine	100 subroutines		
High-speed counter	Single-phase: 1ch: 50kHz/2ch: 30kHz/3 or 4ch: 20 kHz / Two-phase: 1ch: 20kHz/2ch: 15kHz		
Pulse output	1 channel: 100kHz / 2 channel: 60kHz		
PWM output	2 channels, 1.5 to 12.5 kHz (at resolution of 1000) / 15.6 to 41.7 kHz (at resolution of 100)		
Pulse catch input	8 points (X0-X7)		
Interrupt program	9 programs (external 8 points, 1 periodical interrupt point 0.5ms - 30s)		
Self-diagnosis functions	Watchdog timer, program syntax checking, etc.		
Clock/Calendar function	Year, month, day, hour, minute, second, and day of week ⁶		
Volume input	2 points resolving power 10bits (K0-K1000)		
Thermistor input	2 points, resolution: 10 bits (0 to 1000) (for C32T2HTM, C24R2HTM, and C28P2HTM only)		
Link functions	Computer link (1:1, 1:N) ^{3, 4} General communication (1:1, 1:N) ^{3, 4} PLC link ⁵		
Battery life (Battery is optional)	220 days or more* (actual usage value: approx. 840 days (25°C). Suggested replacement interval: 1 year		
Comment storage	All kinds of comments, including I/O comments, remarks and block comments, can be stored (without backup battery)		
Linear/circular interpolation for positioning	Available	Available	Not available
Other functions	Program edition during run, constant scan, forced I/O, password, floating point real number operation, PID processing instruction Comment memory 128Kbyte		

Notes: 1) If a battery is not used, only fixed area is backed up (Counter: C1008-C1023, internal relay: R900-R97F, Data register: DT32710-DT32764). If a battery is used, backup is possible: Area-setting of hold or no-hold is possible by system register.

2) Points can be increased using auxiliary timer.

3) Optional communication cassette (RS232C type) is necessary for 1:1 communication.

4) Optional communication cassette (RS485 type) is necessary for 1:N communication.

5) Optional communication cassette (RS485 type) is necessary.

6) Optional battery is necessary in order to use Clock/Calendar function. Precision calendar timer: at 25°C = 77°F less than 51-second error per month / at 0°C = 32°F less than 119-second error per month / at 55°C = 131°F less than 148-second error per month.

*Value applies when no power is supplied at all.

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Specification tables

INPUT SPECIFICATIONS

Insulation method	Optical coupler
Rated input voltage	24VDC
Input voltage range	21.6 to 26.4VDC
Rated input current	3.5mA - 8mA depends on input no.
Input points per common	8 points/common (FPG-C24), 16 points/common (FPG-C32/C28), 32 points/common (FPG-XY64). Either the positive or negative of input power supply can be connected to terminal
Min. ON voltage / Max. OFF current	19.2V / 3mA - 6mA depends on input no.
Max. ON voltage / Min. OFF current	2.4V / 1.3mA
Input impedance	3k - 6.8k depends on input no.
Response time	CPU: 1ms or less, 5μs (HSC, pulse catch, interrupt input) Expansion: 0.2ms (OFF -> ON) 0.3ms (ON -> OFF)
Operating indicator	LED

OUTPUT SPECIFICATIONS -TRANSISTOR OUTPUT TYPE

Item	FPG-C32 (NPN)	FPG-C28 (PNP)
Insulation method	Optical coupler	
Output method	Open collector	
Rated voltage range	5 to 24VDC	24VDC
Operating load voltage range	4.75 to 26.4VDC	21.6 to 26.4VDC
Max. load current	For Y0, Y1, Y3, Y4: 0.3A For Y2, Y5 to YF: 0.1A	For Y0, Y1, Y3, Y4: 0.5A For Y2, Y5 to YB: 0.3A
Max. surge current	For Y0, Y1, Y3, Y4: 0.9A For Y2, Y5 to YF: 0.5A	For Y0, Y1, Y3, Y4: 1.5A For Y2, Y5 to YB: 0.7A
Output points per common	16 points/common	12 points/common
Response time	OFF -> ON For Y0, Y1, Y3, Y4 at 15mA or less: <2μs For Y2, Y5 and higher: < 0.2ms ON -> OFF For Y0, Y1, Y3, Y4 at 15mA or less: <8μs For Y2, Y5 and higher: < 0.5ms	
Power supply for driving internal circuit	none	
Operating indicator	LED	
Phase fault protection	Thermal protection for Y2, Y5 and higher	

OUTPUT SPECIFICATIONS -RELAY OUTPUT TYPE

Output type	Normally open (1 Form A)
Rated control capacity	2A 250VAC, 2A 30VDC (max. 4.5A/common)(resistive load)
Output points per common	8 points/ common
Response time	OFF -> ON: 10ms or less ON -> OFF: 8ms or less
Mechanical life time	20 million operations or more
Electrical life time	100.000 operations or more
Surge absorber	21.6 to 26.4VDC (70mA)
Operating indicator	LED

GENERAL SPECIFICATIONS

Rated operating voltage	24VDC
Operating voltage range	21.6 to 26.4VDC
Allowable no voltage time	4ms (at 21.6V), 10ms (at 26.4V)
Ambient temperature	0°C to +55°C
Storage temperature	-20°C to +70°C
Ambient humidity	30 to 85% RH (Non-condensing)
Storage humidity	30 to 85% RH (Non-condensing)
Vibration resistance	10 to 55Hz, 1 cycle/min., double amplitude of 0.75mm, 10min. on 3 axes

Shock resistance	98m/s ² or more, 4 times on 3 axes
Noise humidity	1,000V (p-p) with pulse widths 50ns and 1μs
Operating condition	free from corrosive gasses and excessive dust